
Description and operation

This chapter focuses on using the MCU/MCA keypad dialing features, as well as two different dialing protocols (NT menu and AT commands) available from the terminal keyboard.

Looking at the keypad

A standard 12-button pad with digits 0 through 9, *, and # lets you initiate asynchronous or synchronous data calls to local or remote hosts.

Using the keypad

Follow these steps to execute commands using your telephone keypad:

- 1 Press the Program key.
- 2 Press the desired digits or symbol from [Table 2](#).
- 3 Execute the command by pressing the Program key again.

Table 2
Program key commands (Part 1 of 4)

Program Key digits	Definition	Notes
#	Manual data call	MCA only.
*	Release data call	MCA only.
00–09		Program options 00 through 09 are self explanatory and operate similar to how they operate on the Meridian Modular Telephone. Options 01 (Predial Recall) and 03 (Call Timer Enable) are not supported by the MCU.
20	Asynchronous mode	
21	Synchronous mode	Display required.
22	Baud rate	
23	Space parity	
24	Odd parity	
25	Even parity	
26	Mark parity	
27	Host mode	Prompts are not sent to terminal.
28	Terminal mode	Prompts are sent to terminal.
29	Hotline off	Turns hotline off (see Program Key command 30).
30	Hotline on	Auto dials when the MCU/MCA detects a position DTR transition or a carriage return (carriage return not applicable in synchronous mode).
31	Virtual leased line off	Turns leased line off (see Program Key command 32).
32	Virtual leased line on	For applications that require constantly active data call, emulates a dedicated line between terminal and another device.

Table 2
Program key commands (Part 2 of 4)

Program Key digits	Definition	Notes
33	Forced DTR off	Turns forced DTR off (see Program key command 34).
34	Forced DTR on	Forces data call connection even if RS-232 DTR lead is not active. Useful for sending data to a printer or for PC-PC connections where neither PC is configured as host (see Program key command 36).
35	Dynamic carrier detect off	Turns DCD off (see Program key command 36).
36	Dynamic carrier detect on	DCD is constantly high (except for 100 ms after a call is dropped). Included for communication software that requires DCD transition from low to high to activate Answer mode.
37	Remote loopback off	Turns remote loopback off (see Program key command 38).
38	Remote loopback on	Remote loopback is activated for next call.
39	Cancel data ring again	MCA only.
40	Full duplex	
41	Half duplex	Applies to synchronous mode only.
42	Modem mode	MCU/MCA emulates a modem.
43	Network mode	Clocks from a digital network can pass through.
44	Internal clock	Transmitted data clock (DCE mode drives PIN 15 SCT).
45	External clock	Transmitted data clock (DCE mode receives PIN 24).
46	PSDS mode off	Turns PSDS mode off (see P47).
47	PSDS mode on	Use Public Switched Data Services.

Table 2
Program key commands (Part 3 of 4)

Program Key digits	Definition	Notes
48	Enable echo canceller	For PSDS.
49	Disable echo canceller	For PSDS.
50	SL-1 mode	For default mode; see P51.
51	SL-1/DMS-100 mode	When the DMS data unit calls MCU/MCA in synchronous mode, MCU/MCA enters full duplex. To keep MCU/MCA at half duplex, program for SL-100/DMS-100 mode.
54	V.25 bis mode off	
55	V.25 bis mode on	For automatic calls with group IV fax, visit video, video conferencing.
56	Bisynch on	Selects the V.25 bis byte oriented Bisync protocol.
57	HDLC on	Selects the V.25 bis bit oriented HDLC protocol.
58	Assert RTS off	RTS/CTS H/W flow control. Asynchronous mode only.

Table 2
Program key commands (Part 4 of 4)

Program Key digits	Definition	Notes
59	Assert RTS on	H/W flow control disabled.
60	Auto dial programming	MCA only. (For MCU, use dedicated feature key.)
61	Auto dial call	MCA only. (For MCU, use dedicated feature key.)
62	Data parameter display	Applies only to units with display modules.
63	EIA leads status display	Applies only to units with display modules.
64	Monitor data call	Applies only to units with display modules.
65	Reset to default parameters	See procedure 16 for default settings.
66	Emulation selection	Hayes Smartmodem emulation.
67	Lock/unlock data parameters	For locking the operating data parameters.
68	VDN key assignment	MCA only.

Using Program key commands

Procedure 1 RS-232 monitor

A display is needed to use this command.

- Press Program key and dial 63.

The display shows:

TXD	RXD	DCD	DTR	DSR
0	0	•	•	•

This feature is used for troubleshooting. It indicates the status of the EIA leads of the RS-232 device connected to the MCU/MCA. A dark circle means the lead is active.

Note: When in synchronous mode, TXD and RXD are dark. These are not used in synchronous mode, and have no meaning.

Procedure 2 Selecting asynchronous or synchronous mode

A display is recommended to use synchronous mode. Change the baud rate before changing the mode from synchronous to asynchronous.

If an MCU/MCA in synchronous mode calls another data module in asynchronous mode, the call is connected. You must drop the call.

Note 1: If the MCU/MCA is in asynchronous mode, and a long unterminated cable is connected to the DB-25, the MCU/MCA will attempt to autobaud to the noise and will appear to be locked up.

Note 2: If a synchronous DTE is connected to an asynchronous MCU/MCA, the MCU/MCA will constantly try to autobaud and will appear to be locked up. Disconnect the DTE, configure MCU/MCA for synchronous mode and reconnect the DTE.

To select asynchronous mode:

- Press Program key and dial 20.

To select synchronous mode:

- Press Program key and dial 21.

Procedure 3**Data call monitor**

A display is needed to use this command.

- Press Program key and dial 64.

The display shows one of the following prompts:

DATA CALL CONNECTED

or

DATA CALL MONITOR CODE

or

INCOMPATIBLE INCOMING CALL RELEASED

or

UNDER TEST (when the far end is in Program key command 38 (Remote Loopback) mode before the call is made)

This simply shows the status of incoming data calls.

Procedure 4**Language selection**

- 1 Press Program key and dial 05.

The display shows the name of the current language selection.

- 2 Use the volume control to scroll through the possible choices.

The languages listed are those supported by your telephone.

- 3 Dial the number shown next to the language choice you desire and press the Program key.

Procedure 5
Change baud rate

To set the baud rate for incoming calls or calls made using keypad dialing:

- 1 Press Program key and dial 22.

BAUD RATE

ENTER DIGITS, THEN P

- 2 Dial the number of the actual baud rate desired (19200, for example) and press Program key.

INPUT ACCEPTED

or

BAUD RATE

INVALID INPUT, REENTER

Procedure 6
Change parity (asynchronous only)

In asynchronous mode, the MCA is designed to work with 8 bit data characters. You can use various parity settings, but the total character length must equal 8 bits. The MCA accepts the following character lengths and parity settings:

- 8 data bits, no parity bit
- 7 data bits + one bit of Even parity
- 7 data bits + one bit of Odd parity
- 7 data bits + one bit of Mark parity
- 7 data bits + one bit of Space parity

For ASCII data, 8 bits no parity equals 7 bits with space parity.

The MCA controls parity only when it displays prompts before the data call is established. In this case, the MCA outputs the prompts to the DTE with the parity settings defined with Program key commands 23-26, or it determines parity automatically with the <CR>. (period) <CR> sequence.

Once the data call is established, the MCA does not check or regenerate parity. The MCA will transport the 8-bit character to the far end with the parity unchanged.

To set parity to space parity:

- Press Program key and dial 23.

To set parity to odd parity:

- Press Program key and dial 24.

To set parity to even parity:

- Press Program key and dial 25.

To set parity to mark parity:

- Press Program key and dial 26.

Procedure 7

Host or Terminal mode (asynchronous only)

To change to host mode:

- Press Program key and dial 27.
Prompts will not be sent to your terminal.

To change to Terminal mode:

- Press Program key and dial 28.
Prompts will be sent to your terminal.

Note: In host mode, even when Forced DTR is turned on, the call will be dropped if DTR is dropped.

Procedure 8

Hotline

To turn Hotline on:

- Press Program key and dial 30.
Keyboard dialing automatically makes calls to the Autodial number.
The actual Hotline call is placed when the MCU/MCA sees a positive transition of DTR or detects a carriage return <CR>. Note that <CR> does not apply to synchronous mode.

To turn Hotline off:

- Press Program key and dial 29.

Procedure 9

Virtual Leased Line

To turn on Virtual Leased Line:

- Press Program key and dial 32.

This gives the appearance of a dedicated line between your terminal and the far end data device, for applications that require an active data call at all times. Autodial needs to be programmed before the VLL feature is selected.

To turn off Virtual Leased Line:

- Press Program key and dial 31.

Note: If a power failure occurs while Virtual Leased Line is on, the MCU/MCA will automatically call back the Autodial number when power returns.

Procedure 10

Forced DTR

To turn Forced DTR on (Data Terminal Ready):

- Press Program key and dial 34.

Note: This feature is useful for sending data to a printer or for PC to PC connections where neither is configured as the host.

You can force a data call connection even though the DTR load of the RS-232 is not active.

To turn Forced DTR off:

- Press Program key and dial 33.

Procedure 11

Forced DCD

To turn Forced DCD on:

- Press Program key and dial 35.

Note: This feature is included for those communication software packages that require a transition of Carrier Detect from low (0) to high (1) in order to activate Answer mode.

Data Carrier detect will always be high, except for 100 ms when a call is first dropped.

To turn Forced DCD off:

- Press Program key and dial 36.
Data Carrier Detect will follow the state of the call.

Procedure 12

Remote Loopback

To turn on Remote Loopback:

- Press the Program key and dial 38.
Remote Loopback is activated for the next data call only.

To turn Remote Loopback off:

- Press the Program key and dial 37.

Procedure 13

Inactivity timeout (asynchronous)

The inactivity timeout limit is set by the telephone system administrator. The four settings are: off, 15 minutes, 30 minutes, or one hour.

To see what the Timeout limit is, use display parameters, as described in the following procedure.

Procedure 14

Display parameters

A display is needed to use this command.

- 1 Press Program key and dial 62.

The display shows Screen 1:

DATA PARAMETER DISPLAY

SCROLL <<<>>>, P TO EXIT

- 2 You can scroll the display using the volume control key on the phone. It will show MCU/MCA parameters that can be modified through keypad dialing.

The examples below show possible values for each parameter, and their meaning in asynchronous mode.

Screen 2 shows:

**DTR OFF BAUD RATE 19200
DCD OFF EVEN PARITY**

Screen 3 shows:

**VLL OFF TERMINAL MODE
RLB OFF HOTLINE OFF**

Screen 4 shows:

**RTS ON DEFAULT DM-DM
ASYNCHRONOUS MODE DM-DM IN USE**

Screen 5 for MCA shows:

**DDN 4100 VDN KEY 0
TIMEOUT OFF**

Screen 5 for MCU shows:

**DDN 4100
TIMEOUT OFF**

Screen 6 shows:

NT KBD DIALING

Abbreviations:

**DTR = Data Terminal Ready
DCD = Data Carrier Detect
VLL = Virtual Leased Line
RLB = Remote Loopback
DDN = Data Directory Number**

Procedure 15
Lock data parameters

To lock your configuration settings so that no data parameters can be changed (by using Program Key Command-65 or any other command):

- 1 Press the Program key and dial 67.
- 2 Using the volume control key, scroll the telephone's display until it reads "DATA PARAMETERS LOCKED."
- 3 Press the Program key to exit and save the change.

To unlock the parameter settings:

- 1 Press the Program key and dial 67.
- 2 Using the volume control key, scroll the telephone's display until it reads "DATA PARAMETERS UNLOCKED."
- 3 Press the Program key to exit and save the change.

Note 1: Even if parameters are locked, they can be changed for a call. The new parameters are used only for the active call. MCU/MCA returns to the locked parameter settings when the call is released.

Note 2: In the event of a power outage the MCU/MCA will retain all the parameters, including the locked/unlocked state of Program key command 67.

Procedure 16
Reset data parameters

To reset the MCU/MCA configuration to default settings:

- Press the Program key and dial 65.

Note: Unplugging the telephone does not reset MCA configuration.

The data parameters return to the following default settings:

Asynchronous

Keyboard dialing
Autoanswer
DTR OFF
DCD ON
Baud rate 9600
Hot Line OFF

Synchronous

Hotline OFF
Autoanswer
DTR OFF
DCD ON
Baud rate 56000
Virtual Leased Line OFF

Asynchronous

Remote Loopback OFF
Full duplex
Asserts RTS ON
Space parity
Terminal mode

Synchronous

Remote Loopback OFF
Full duplex
PSDS OFF
Internal clock
Modem mode
SL-1 mode
V.25 bis OFF

Procedure 17

Select emulation (asynchronous only)

To select the modem type that the MCU/MCA will emulate:

- 1** Press the Program key and dial 66.
- 2** Using the volume control key, scroll the telephone's display until the correct modem type appears.
- 3** Press the Program key to exit and save the emulation setting.

Possible emulation settings are:

SMARTMODEM 2400
SMARTMODEM 2400
SMARTMODEM 1200
NT KBD DIALING

Note 1: Unless NT keyboard dialing is selected as the emulation type, <CR> autobaud is disabled and pressing <CR> does not display the Main menu. Smartmodem emulation only supports Hayes (AT) commands.

Note 2: Some software packages require Forced DTR to be turned on in order to work properly. Turn on Forced DTR (see Program key command 34) if the above procedure fails.

Note 3: If power is dropped while emulating Smartmodem 1200 or 2400, the selection defaults to Smartmodem 9600 upon power up. This does not apply to NT KBD dialing.

Procedure 18**Full duplex/Half duplex (synchronous only)**

These two modes allow you to choose either half or full duplex data transmission while in synchronous mode. MCU/MCA supports full duplex transmission for rates of up to 64K bps and half duplex transmission of up to 19.2K bps.

To choose full duplex:

- Press the Program key and dial 40.

To choose half duplex:

- Press the Program key and dial 41.

Procedure 19**Modem/Network (synchronous only)**

When the modem mode is selected and you are in synchronous mode, the MCU/MCA emulates a modem. In network mode, the MCU/MCA allows clocks from a digital network to pass through.

To choose modem mode:

- Press the Program key and dial 42.

To choose network mode:

- Press the Program key and dial 43.

Procedure 20**External Clock/Internal Clock (synchronous only)**

Use the external clock if you want the Meridian 1 phone to receive and transmit the bit-timing signal from the DTE. Use the internal clock if the Meridian 1 phone is to provide the bit-timing signal.

To use the external clock:

- Press the Program key and dial 45.

To use the internal clock:

- Press the Program key and dial 44.

Procedure 21

SL-1/SL-100/DMS (synchronous only)

Due to the differences between the MCU/MCA and the SL-100/DMS Data Unit (DU), when the DU calls an MCU/MCA in synchronous mode, the MCU/MCA always enters full duplex mode. If half duplex mode is preferred, program the MCA for SL-100/DMS mode. The MCU/MCA will still answer a SL-100 DMS/DU call automatically, but will remain in half duplex mode.

To program SL-100/DMS:

- Press the Program key and dial 50 for SL-1.
- Press the Program key and dial 51 for SL-100/DMS.

Procedure 22

PSDS On/Off (synchronous only)

When PSDS is turned on you can use the Public Switched Data Services (PSDS) feature.

To turn PSDS off:

- Press the Program key and dial 46.

To turn PSDS on:

- Press the Program key and dial 47.

Note: If the called side is in PSDS mode, the calling side will automatically step through to PSDS mode. However the calling side will not send the 2100Hz tone, since the echo canceler is off. If the tone is required, the calling side must be programmed to PSDS on (P47) and the echo canceler must be programmed to on (P48).

Procedure 23

Echo canceller (synchronous only)

Echo canceller is available when PSDS is turned on.

To turn echo canceller on:

- Press the Program key and dial 48.

To turn echo canceler off:

- Press the Program key and dial 49.

Procedure 24**V.25 bis mode (synchronous only)**

This feature allows you to answer calls automatically with DTE.

To program V.25 bis:

- Press the Program key and dial 54 to turn V.25 bis off.
- Press the Program key and dial 55 to turn V.25 bis on.
When V.25 bis (P55) is turned on, the MCU/MCA automatically switches to synchronous mode and Forced DTR is turned off. No auto-answer is provided while in the V.25 mode.
- Press the Program key and dial 56 for bisync on.
This is required for video equipment.
- Press the Program key and dial 57 for HDLC protocol.
This is required for G4 FAX.

Procedure 25**RTS ON/OFF (asynchronous only)**

When RTS is on the MCU/MCA forces the RTS lead active and assumes the local DTE is always ready to transmit or receive data. There is no flow control.

Turning RTS off allows RTS/CTS hardware flow control handshaking. The local DTE can stop the data flow by dropping the RTS lead and the MCU/MCA will drop the CTS lead. The MCU/MCA then sends a message to the far end to drop the CTS lead. When the DTE is ready, it starts the flow by raising the RTS lead. The MCU/MCA raises the CTS lead and the data transmits again.

Using flow controls (RTS OFF) allows the MCU/MCA to operate with printers or other DTE devices that also use flow control.

To turn RTS forcing on (no flow control):

- Press the Program key and dial 58.

To turn RTS forcing off (activate flow control):

- Press the Program key and dial 59.

Procedure 26

VDN key assignment (MCA, asynchronous only)

Use this feature when your telephone is programmed to have more than one Voice DN (VDN). This assigns the VDN of your choice to originate voice calls through the MCA. If your VDN is on a key other than zero, use this assignment to ensure the correct key is used for voice calls.

To use VDN key assignment:

- 1 Press the Program key and dial 68.

The following appears on your display:

VOICE DN KEY (0-5)

ENTER DIGITS, THEN P

- 2 Enter the desired key number and press Program key to assign it.

Procedure 27

Voice call origination (using the MCA secondary channel)

By using a special cable, the MCA can communicate with two DTEs at the same time. The primary channel is the main communication channel offering MCA features. The second channel can respond to Voice Call Origination commands (VCO) only. This provides the ability to make a voice call across the second channel while simultaneously using the primary channel to transmit or receive high speed data. Below is the pinout list to connect the second channel.

Note: The second channel VCO baud rate is 2400.

	RS-232 Pin	V.35 Pin
TxD	14	18
RxD	16	21
GND	7	7

The following commands are available with VCO operation.

ATDP

ATF3

ATF4

ATF5

ATHP

ATTSP!

For a brief description of these commands, refer to ["AT commands" on page 41](#).

MCA keypad dialing

Keypad dialing is available in synchronous and asynchronous mode. The answering data module always adapts to the calling data module parameters.

Procedure 28

Making manual data calls

To make a manual data call:

- 1** Press the Program key, followed by an octothorpe (#).
- 2** If you do not have a display, enter the number, followed by the Program key
- 3** If you have a display, at the following prompt enter the number and then the Program key.

MDIAL

ENTER DIGITS, P to EXIT

The screen confirms the connection:

DATA CALL CONNECTED

Procedure 29

Autodialing

To autodial:

- Press the Program key, and dial 61.

To program the autodialer:

- 1** Press the Program key, and dial 60.
- 2** If you do not have a display, enter the desired number followed by the Program key.
- 3** If you have a display, at the following prompt enter the number, and then the Program key.

ADIAL

ENTER DIGITS, THEN P

Procedure 30
Making Ring Again calls

If the manual or automatically dialed number is busy, Ring Again is automatically placed.

If you have a display, you see the message:

RING AGAIN PLACED

To verify the connection:

- Press Program key and dial 64.

The display reads:

DATA CALL CONNECTED

To cancel a Ring Again:

- 1** Press the Program key and dial 39.
- 2** If you do not have a display, press the Program key again.
- 3** If you have a display, at the following prompt press the Program key to exit.

RING AGAIN CANCELLED
ENTER P to EXIT

MCU keypad dialing features

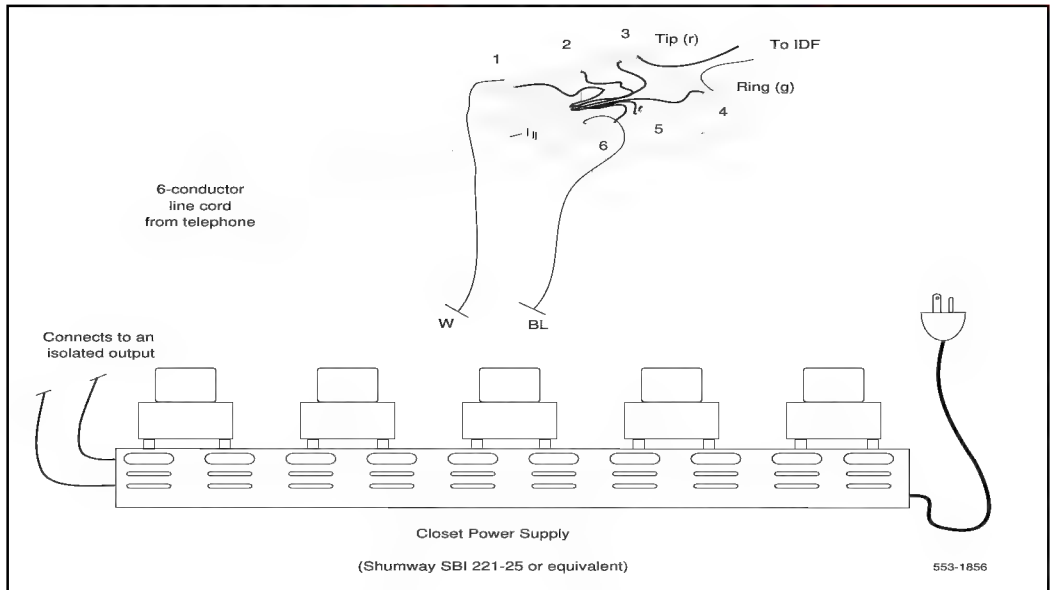
The MCU has the following feature keys:

- Speed Call: lets you call a directory number (DN) using a code of up to three digits. Any number of users can be assigned to any list, although it is unwise to combine voice and data entries on the same list.
- Autodial: lets you program the module with a frequently used number that is automatically dialed.
- Ring Again: allows queuing of calls to busy DNs within a customer group, alerts the caller when the busy DN is free, and provides automatic callback to the DN.
- Data Directory Number (DDN): allows you to answer an incoming call manually or to initiate a data call using keypad dialing.
- Display: to display autodial and speed call numbers

- Program, described in [“Looking at the keypad” on page 9.](#)
- Release: lets you disconnect a call.

[Figure 1](#) shows the MCU.

Figure 1
Meridian Communications Unit



MCU keypad dialing

The following procedures describe how to use the various features. You will probably only use one or two features at a time.

Procedure 31

Initiating MCU keypad dialing

Make sure the data station is idle and the MCU power is on.

- 1 If you have data Autodial, see ["Autodial" on page 31](#). If not, go to Step 3.

 DN must be equipped with Autodial.
- 2 If you have Speed Call, see ["Speed Call" on page 31](#). If not, go to Step 3.

 DN must be equipped with Speed Call.
- 3 Press the DDN key.

 The DDN LCD lights up and the display appears blank. You hear a dial tone. See the following procedures to call a local host or smart modem or a dumb modem pool.

Procedure 32

Calling a local host or a smart modem pool

- 1 After initiating MCU keypad dialing (see the previous procedure), enter the number.

 You can enter any number, as well as # and *.

 MCU sends the digits to the switch, which places the call to the host. The digits appear on the display. The MCU receives a Ringback tone.

 The Ringback tone turns off when the call is answered. The data modules perform handshake and the data channel becomes transparent.

 The data module connected to the host answers, the status LED goes on and the following prompt appears on the DTE monitor if you are in asynchronous mode:

 CALL CONNECTED
 SESSION STARTS
- 2 If the called host is busy, see ["Activating Ring Again" on page 32](#).

- 3 Once the data session begins, follow the log in procedures and proceed with the data session.

The host echoes all typed input. When you are ready to disconnect, see [“Disconnecting a call” on page 34](#).

Procedure 33

Autodial

If Autodial is active:

- 1 Press the DDN key.

The DDN LCD is on, and you hear a dial tone.

- 2 Press the Autodial key.

The display shows the previously programmed Autodial number. The switch places the call to the predesignated number.

When the call answers, the status LED goes on and the following prompt appears on the DTE monitor:

CALL CONNECTED
SESSION STARTS

- 3 If the called host is busy, see [“Activating Ring Again” on page 32](#).

- 4 Once the data session begins, follow the log in procedures and proceed with the data session.

The host echoes all typed input. When you are ready to disconnect, see [“Disconnecting a call” on page 34](#).

Procedure 34

Speed Call

Your speed call numbers must be programmed in the database associated with your DDN.

If Speed Call is active:

- 1 Press the DDN key.

The DDN LCD turns on and you hear a dial tone.

- 2 Press the Speed Call Key.

The Speed Call LCD turns on and the dial tone turns off.

- 3** Enter the 1-, 2-, or 3-digit code to access the number to be dialed.
- The Speed Call LCD turns off and you hear a Ringback tone. The switch calls the stored number. The LCD turns on, the Ringback tone turns off, and you will hear tones indicating the call is in progress. The data modules perform handshake and the data channel becomes transparent.
- When the call answers, the status LED goes on and the following prompt appears on the DTE monitor:
- CALL CONNECTED
SESSION STARTS**
- 4** If the called host is busy, see ["Activating Ring Again" on page 32.](#)
- 5** Once the data session begins, follow the log in procedures and proceed with the data session.
- The host echoes all typed input.
- 6** When you are ready to disconnect, see ["Disconnecting a call" on page 34.](#)

**Procedure 35
Activating Ring Again**

If Ring Again is active and you have called and the host is busy, you will hear a busy tone and see the prompt:

**DESTINATION BUSY
ACTIVATE RING AGAIN**

If you do not have Ring Again and the host is busy, the DDN LCD flashes. Release the DDN key

To activate Ring Again:

- 1** Press Ring Again once.
- You can cancel Ring Again at any time before call completion by pressing Ring Again a second time.
- If Ring Again is active, the Ring Again LCD turns on and the DDN LCD turns off. If Ring Again is cancelled, the Ring Again LCD turns off.
- When the called port becomes free, the Ring Again LCD blinks and you see the prompt:
- RING AGAIN READY
SELECT LINE, RING AGAIN?**

- 2** Press the DDN key and then the Ring Again key.

The status LED goes on and the following prompt appears on the DTE monitor if you are in asynchronous mode:

CALL CONNECTED
SESSION STARTS

The Ring Again LCD turns off, the Ringback tone turns off, and the called port number is displayed.
- 3** Once the data session begins, follow the log in procedures and proceed with the data session.

The host echoes all typed input.
- 4** When you are ready to disconnect, see ["Disconnecting a call" on page 34.](#)

Procedure 36
Disconnecting a call

- 1 Enter a disconnect command to terminate the session, and to initiate call disconnect by the host terminal.

For local host disconnection, the device (ADM, MCDS, DAC, MCU) connected to the host must be configured to monitor the host DTR. For disconnection by a remote host, the host modem must be configured to monitor the host DTR.

Entering a disconnect command causes the host to drop DTR and release the connection.

or

Press the Release key.

or

Press the break key for 1.6 seconds (asynchronous only).

For terminals with overlapping timed breaks, press the break key several times.

Note: This method does not work on terminals with non-overlapping timed breaks.

or

Use three short breaks at least 100 ms long within one second

When the call disconnects, the time and date appear on the display. The DDN LCD and the status LED are off.

Procedure 37**Program or modify Autodial**

- 1 Press the Autodial key (do not press the DDN key).

The Autodial LCD blinks, and you see the prompt:

**PROGRAMMING AUTODIAL
ENTER NUMBER**

- 2 Enter the new number.

The display shows the digits you entered and shows the prompt:

PRESS AUTODIAL TO SAVE

- 3 Press the Autodial key.

The Autodial number is changed to the new number. The Autodial LCD turns off and the display returns to the idle state.

Procedure 38**Program or modify Speed Call**

- 1 Press Speed Call key (do not press the DDN key).

The Speed Call LCD blinks and you see the prompt:

**PROGRAMMING SPEED CALL
ENTER CODE AND NUMBER**

- 2 Dial the 1-, 2-, or 3-digit access code.

- 3 Dial the Speed Call number.

Include * and # where necessary. The code and number appear on the display. The following prompt appears:

PRESS SPEED CALL TO SAVE

- 4 Press the Speed Call Key.

The Speed Call LCD turns off and the display returns to idle. The Speed call list now contains the new entry.

- 5 To program additional numbers, repeat these steps. Use a different access code for each number.

Using the keyboard

You can initiate data calls to local or remote hosts using the terminal keyboard of a DTE. Keyboard dialing capability is available only for ASCII, asynchronous, character mode, interactive terminals equipped with an RS-232 interface and connected to the MCU/MCA. For most calls, the keypad commands are adequate. However, more sophisticated communications applications (for example, those that interface with other software) require keyboard input.

NT menu and AT commands are the two protocols available for keyboard dialing. NT menu is the Northern Telecom standard. AT is the Hayes Smartmodem standard.

Note: The answering data module always adapts its mode to the calling data module.

Special keyboard capabilities

The keyboard has many of the same calling features as the keypad. In addition, the keyboard provides:

- Autobaud. After autobauding, MCU/MCA remembers the current speed.
- Autoparity. MCU/MCA detects the carriage return character speed. If the terminal parity matches the 8-bit no parity default, a legible prompt appears. If a legible prompt does not appear, you need to enter a period, followed by a carriage return to force the MCU/MCA to detect the parity.
- Asynchronous data baud rates of 110, 150, 300, 600, 1200, 2400, 4800, 9600, and 19200 bps.
- Two stop bits for 110 bps and one bit for other baud rates.
- A menu driven interface (NT proprietary).

Making and answering calls using NT menus

NT protocols simplify the process of making and answering calls while providing features that can speed or automate calling.

Procedure 39

Making calls

- 1 Enter a carriage return to display the following prompt:

ENTER NUMBER OR H (FOR HELP)

- 2 Type the number desired.

or

Press H to access the Help menus.

Normally, the call is answered and you begin the login procedures required by the host terminal. For information on call variations (busy signals, digital trunk calls, smart modem pool calls) see ["Handling call variations" on page 46](#).

Using the Help menus

Pressing H produces a Command menu with six selections:

A - AUTODIAL Select to automatically dial the stored number.

C - CALL Select, then enter telephone number. The result is the same as if the number had been entered in response to the original prompt.

D - DISPLAY Displays terminal parameters.

S - SPEED CALL After entering access code, the system speed dials the predesignated number.

M - MODIFY Accesses the Modify menu (see the following section).

F - SCRIPT FILE DIRECTORY Lists the script files that currently reside in the user's directory (applies only to MCA).

Using the Modify menu

Select M from the Command menu to access the Modify menu.

A - AUTO NUMBER You are prompted with the message **AUTO DIAL NO** to enter the new number to be stored for automatic dialing.

S - SPEED NUMBER You are prompted to ENTER ACCESS CODE, then to enter a new SPEED NUMBER.

R - REMOTE LOOPBACK You are prompted with REMOTE LOOPBACK (Y/N).

M - MANUAL ANSWER You are prompted with MANUAL ANSWER (Y/N), where a no response indicates automatic answer.

Q - QUIT MODIFY Exits the Modify menu.

F - SCRIPT FILE (for MCA only): Accesses the Script menu (see the following section).

Using the Script menu (MCA only)

Select F from the Modify menu to access the Script menu.

C - LEARN SCRIPT Accesses Learn Script menu (see the following section).

D - DELETE SCRIPT Accesses Delete Script menu (see the following section).

E - ESCAPE CODE

Q - QUIT Exits the Script menu.

Using the Learn Script/Delete Script menus (MCA only)

The Learn Script and Delete Script menus have similar prompts:

A - LEARN/DELETE AUTO DIAL SCRIPT Allows you to create or delete an autodial script.

S - LEARN/DELETE SPEED CALL SCRIPT Allows you to create or delete a speed call script.

D - SCRIPT FILE DIRECTORY Lists the script files in your directory.

Q - QUIT Exits menu.**Procedure 40**
Answering calls

Unless Manual Answer is turned on (["Using the Modify menu" on page 38](#)), calls are answered automatically.

- 1** When Manual Answer is turned on, the calling number appears on the screen followed by the message:

INCOMING CALL. ANSWER? (Y/N<Y>)

- 2** To answer the call, type a <CR> or a Y, followed by a <CR>.

Usually you will see an **INCOMING CALL CONNECTED** message.
For other possible responses, see the following section.

Rules and information governing NT menu operation

The following rules apply to NT dialing:

- The data terminal must be on-line. Both the terminal and the MCU/MCA must be turned on.
- Make sure that any special features have been programmed. (If you access Speed Call or Autodial and no number has been programmed, the message NOT IN SERVICE appears and the call is released.)
- Typed input may be in lower or upper case and must be terminated by a carriage return (or equivalent).
- Edit input using the backspace or delete keys or their equivalents.
- All prompts and messages in setup appear in upper case. Prompts that require you to input information are followed by a colon and a space (:). All messages are followed by a semicolon and carriage return or line feed.
- Dial a call using the keyboard numbers and *, and #. No other characters are accepted. Typing invalid characters displays the message INVALID COMMAND/ENTRY followed by the prompt to REENTER.
- A call to an invalid number produces a NOT IN SERVICE message and releases the call.
- Abandon an asynchronous call during setup by using <Ctrl-Z>.

- If you receive a call from someone who has requested a data loopback, the display shows the message UNDER TEST instead of the message DATA CALL CONNECTED.
- If the call cannot be completed even though the station is not busy, the message SERVICE UNAVAILABLE CALL RELEASED appears.
- If you change the terminal speed and do not re-autobaud, the system prompt may contain unreadable characters. Enter a <CR> to force an autobaud.
- If an incoming call has a mismatched baud rate or unsupported data pattern, you will receive the message INCOMPATIBLE INCOMING CALL.
- Return to the menu any time you receive the prompt REENTER.
- If the DN has a digit display feature, the digits appear as the system sends them.

Calling with AT commands

AT commands are appropriate for calls that interface with other software applications. The AT standard is universally accepted, but requires more keystrokes than NT.

Procedure 41 Making an AT call

- 1 Press <Ctrl-Z>.

AT commands are prefixed with the letters AT.

- 2 Type the AT command and press <CR>.

Table 3 shows the calling commands available with AT. Command lines are limited to a maximum of 40 characters, not including the AT and spaces.

The letter “n” represents a digit or symbol (0-9, #, *) dialed. If you omit the digit, the system assumes that the parameter is zero. Commands have different possible digits and symbols; see the notes for each command.

Table 3
AT commands (Part 1 of 3)

Command	Meaning	Notes
ATA	Answer incoming data call	If MCU/MCA is set for manual answer in S registers.
ATDnnnn	Dial	
A/	Repeat last command	Carriage return not required.
ATO	On-line	To go off line, type three escape characters in quick succession.
ATDPnnnn	Voice call	Maximum 32 digits. Available only with MCA.
ATF3	Handsfree/mute	Toggle between mute and normal. Available only with MCA.
ATF4	Voice call on hold	Available only with MCA.
ATF5	Select (voice call off hold)	Available only with MCA.

Table 3
AT commands (Part 2 of 3)

Command	Meaning	Notes
ATH0	Hang up data call when MCU/MCA is off-line	Must first be off-line. To go off line, type three escape characters in quick succession. Return to on-line mode by entering ATO.
ATHP	Hang up voice call	Available only with MCA.
ATIn	Product ID code	If n=0, sends Smartmodem ID (default 960; can also be 122 or 240). If n=1, sends result code '206. If n=4, sends result codes 'a037800C004420' and 'b100000000.' (These are the same values returned by the Smartmodem V-series 9600.)
ATQn	Result code	If n=0, results codes are sent. If n=1, no result codes are sent. The result codes are: 0: ok; command was successful 1: connect; far end answered 2: ring; local end is ringing 3: no carrier; call was released 4: error; command line contains error 5: connect 1200 7: busy; busy signal detected 10: connect 2400 11: connect 4800 12: connect 9600 14: connect 19200
ATVn	Verbal result	If n=0, number codes are sent. If n=1, no numeric codes are sent. See ATQn for result codes.
ATXn	Result code selection	If n=1, supports result codes 0–4. If n=1 or 2 supports all result codes except 7. If n=3 or 4 supports all result codes. See ATQn for result codes.
ATSn?	Reads the value of S register n	See "Reading and writing to S registers" on page 44.
ATSn=xxx	Writes xxx to S register n	See "Reading and writing to S registers" on page 44.

Table 3
AT commands (Part 3 of 3)

Command	Meaning	Notes
ATZ	Soft reset to default parameters	Returns registers S0 through S49 and AT configurations to default settings.
ATCn	Carrier detect	If n=1, carrier detect is enabled. If n=0, it is disabled.
ATEn	Echo	If n=1, command echo back to terminal. If n=0, there is no echo.
ATTSP!	Transparent mode	Displays raw signaling messages between PBX and the Meridian Modular Telephone (not available with MCU).
AT&Cn	Carrier detect control	If n=1, carrier detect is asserted. If n=0, it is not asserted.
AT&Dn	DTR response	When DTR status changes and n=0, ignore. If n=1, go off-line. If n=2, release the call. If n=3, release the call and return Hayes parameters to default.
AT&Rn	Clear-to-send	If n=1, CTS is always present. If n=0 it is not always present.
AT&Sn	Data set ready	If n=0, DSR is always present. If n=1, it is not always present.
AT&F	Soft reset to default parameters	Returns registers S0 through S49 and AT configuration to default settings.
AT&Y	Soft reset to default parameters	Returns registers S0 through S49 and AT configuration to default settings.

Dialing modifiers

- The following rules apply to calling telephone numbers:
- Use digits 0–9 and * and # for placing calls.
 - To instruct the system to begin dialing the digits entered, press #.
 - To output a tone, press *.
 - Delay processing by pressing a comma (time delay is set in S8 register).
 - Return to command state after dialing by using a semicolon.

Procedure 42
Reading and writing to S registers

The S registers configure the MCU/MCA. [Table 4](#) shows the S register values.

To read an S register:

- Type ATSn?
- where n is the register number.

To write to an S register

- Type ATSn=x
- where x is the new value for the S register:

Table 4
S register values (Part 1 of 3)

Register	Definition	Notes
S0	Number of rings incoming, range 0–255	Disable auto answer by setting n=0. Set to other value to indicate number of rings before call answer.
S1	Ring count	This is a read-only register that stores current number of rings for incoming data calls.
S2	Escape character, range 0–255	ASCII value of escape character. If set to a value of 128 or greater, escape character is disabled. The default is 43.

Table 4
S register values (Part 2 of 3)

Register	Definition	Notes
S3	Carriage return character, range 0–127	ASCII value of carriage return used for command line termination and prompt termination. The default is 13.
S4	Line feed character, range 0–127	ASCII value of line feed character; default is 10.
S5	Backspace character, range 0–32, 127	Holds two values for backspace, one for the backspace key, one for the character echoed to move the cursor back. The default is 8.
S6	Wait time before blind typing	Not applicable.
S7	Wait time for carrier/dial tone; range 1–255	Holds Carrier detect timeout value; when time in seconds elapses; call is released. Default is 30 seconds.
S8	Pause time for comma; range 0–255	A comma delays call dialing by the number of seconds defined in this register. The default is two seconds. Does not apply to voice commands.
S9	Carrier detect response time	Not applicable.
S10	Lost carrier hang up delay	Not applicable.
S11	DTMF tone duration	Not applicable.
S12	Escape code guard time range 0–255	Guard time helps recognize escape sequence, used because different numbers of escape characters have different means. Default is 50 (one second).
S51	Delay until modem pool activation; range 0–255	Each S51 increment represents a .25 seconds delay before outbound modem pool activation. The default is 16 (four seconds). Not altered by software reset (applies to SL100 only).

Table 4
S register values (Part 3 of 3)

Register	Definition	Notes
S52,53,54	Product code response	Contain the product identification code returned in response to ATI command.
S66	AT/KBD autobaud interpretation, 0 or 1	A value of 0 means only Hayes autobaud is possible. A value of 1 permits Hayes and keyboard autobaud dialing.

Handling call variations

There are several situations applying to both NT menu and AT command calling procedures that require special handling: busy phone calls, digital trunk calls, manual smart modem pool calls, and access errors.

Procedure 43 **Handling busy calls**

When a number is busy, you will receive a BUSY RING AGAIN? (Y/N) or a BUSY, PREVIOUS RING AGAIN ACTIVE, REPLACE? (Y/N) prompt. The second prompt indicates that another Ring Again is active.

- To cause the system to continue calling the number, type **Y** (yes)

Note: The ring again feature is available for local calls and for queuing on trunk calls.

- To release the call, type **N** (no).

Procedure 44 **Making digital trunk calls**

Digital trunks provide additional, optional features: authorization code, expensive route warning, and off hook queuing.

- If an authorization code is required, you are prompted to enter the code after initiating the call.
- If the system has Least Cost Routing, you can choose whether to take the expensive route or to queue for the next available trunk.
- If the system has Off Hook Queuing, you may be asked to wait for a free trunk.

Procedure 45**Manual smart modem pool calls**

To make a manual smart modem pool call:

- 1 Call the local modem.

The following message appears:

CALL CONNECTED. SESSION STARTS.

- 2 Follow the steps for making a call for your particular smart modem.

For example: ATDT5551212.

The remote modem responds with a **CONNECT** message, and the remote host requests the login sequence.

Dealing with access errors

If you are calling a local modem, you can experience one of three access errors: no answer, modem busy, or illegal number.

- If there is no answer, disconnect the call.
- If the modem is busy, refer to [“Handling busy calls” on page 46](#)
- If the number called is invalid, the message **NOT IN SERVICE** appears and the system releases the call.

If you are calling a remote modem can encounter several difficulties after entering the remote number.

- If you misdial or do not complete dialing within the timeout period (usually 30 seconds) the call is released.
- If the remote modem does not respond properly within the resource block timeout (typically 120 seconds) the call is released.
- If the trunk is busy, out of service, or restricted, you receive a **NOT IN SERVICE** message and the call is released.

Data adapter device

The Meridian Data adapter device, A64, is a 44 pin, 5 volt CMOS device that interfaces with the A44 and the 80C31 microprocessor, providing serial/parallel and parallel/serial conversions as well as reset and clock monitoring circuitry. Timer/counter circuitry regulates synchronous data operation.

Microprocessors

The Signetics 80C31 microprocessor operates at 20 MHz to take advantage of additional real time. It controls MCU/MCA data functions, interfacing with the A64, a set of EIA drivers and receivers, USART, and memory and handling call requests and other protocols.

In the primary channel, a Mitsubishi M50747 microprocessor initializes the A44 and interfaces to the display. The M50747 also performs key scanning and updates the LCD (MCU only).

RS-232 and V.35 drivers

The MCU/MCA uses CMOS 14506A transceivers for RS-232 drivers and receivers. The V.35 interface uses CMOS 34C86 and 34C87 drivers and receivers.

Power

A universal isolated power supply provides +5 volts, +12 volts, and -12 volts to the MCU through a connector on the daughter board. The MCU does not require internal power conversion.

8530 communications controller (MCU only)

The 8530 communications controller performs the same functions as the 2661 USART and provides High-level Data Link Control (HDLC) control to implement Meridian Packet Handler (MPH).

Digital to Analog converters (MCU only)

The 8-bit Digital to Analog converters generate call progress tones for both MCU channels. The 80C31 microprocessors convert the call progress tones and channel them through the communications controller to the Digital to Analog converters.

Memory

Two 64 K ROMs (the main ROM and the language ROM) and one 8 K static RAM reside on each MCA and MCU board.

MCA memory configuration

The main ROM holds the MCA base code (48.5 K) and the English prompts and the Norwegian language prompts (12.5 K). The language ROM holds the Parisian and Quebec French, Spanish, Italian, and Norwegian screen prompts (51 K). The script feature consumes 1.7 K per language.

4 K of the available 8 K static RAM is currently used.

MCU memory configuration

Since the MCU does not support VCO and script features, the English language resides on the language ROM, where there is more space, instead of on the main ROM. As a result, the main ROM has the base code, including the MPH feature (48 K), and the Norwegian language prompts (2 K). Approximately 14 K is available for future development.

The language ROM holds the Parisian and Quebec French, Spanish, German, English, and Norwegian screen prompts (50 K).

5.2 K of the 8 K static RAM is currently used.

MCU/MCA Performance

The MCU/MCA by itself corrupts less than one in 10^9 bits. The corruption rate between the MCU/MCA and another data module connected through the Meridian 1 is less than one in 10^7 bits.

Real time analysis

The worst case requires a total of 95 microseconds of the 125 microseconds available at 20Mhz.

DTE/DCE configurations

The MCU/MCA can connect to a terminal, printer, computer port, fax, video equipment, and other peripherals. MPH requires the DTE interface (MCU only).

Software

For MPH, MCU requires X11 release 19 software or later. Most non MPH applications can use the MCU/MCA with X11 release 14 software or later. To use the PSDS feature, the system must be running X11 release 16 or later.

Operating parameters

The data parameters are stored locally although the configuration is set in the Meridian 1 system.

With X11 release 18 and later, set system parameters using LD 11 or the keypad. (See the *X11 input/output guide* (553-3001-400) for prompt and response details.)

Terminal communication

The MCU/MCA communicates with Data Terminal Equipment (DTE) using the operating parameters shown in the table below.

Table 5
Operating parameters

Synchronization	Asynchronous	Synchronous
Number of Bits	8 bits	6,7,8
Parity	none (unchecked)	Not applicable.
Data rate	110, 150, 300, 1200, 2400, 4800, 9600,19200 bits per second (auto-baud)	1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 38400, 40800, 48000, 56000, and 64000 bits per second
Stop bits	2 stop bits for 110 bits per second; 1 bit for all other speeds	Not applicable.
Transmission	Full duplex	Full or half duplex.

Note: The MCA with the new redesigned footstand, no longer requires an additional power supply board. If you have a phone set with the footstand manufactured before 1997 you will need an additional power supply board or the redesigned footstand MCA kit. [See “Specifications” on page 53.](#) for power requirements information.

[Figure 2](#) shows the back of an Meridian Modular Telephone with an MCA mounted. [Figure 3](#) shows a block diagram of the telephone and MCA.

Figure 2
Back of Meridian Modular Telephone showing MCA

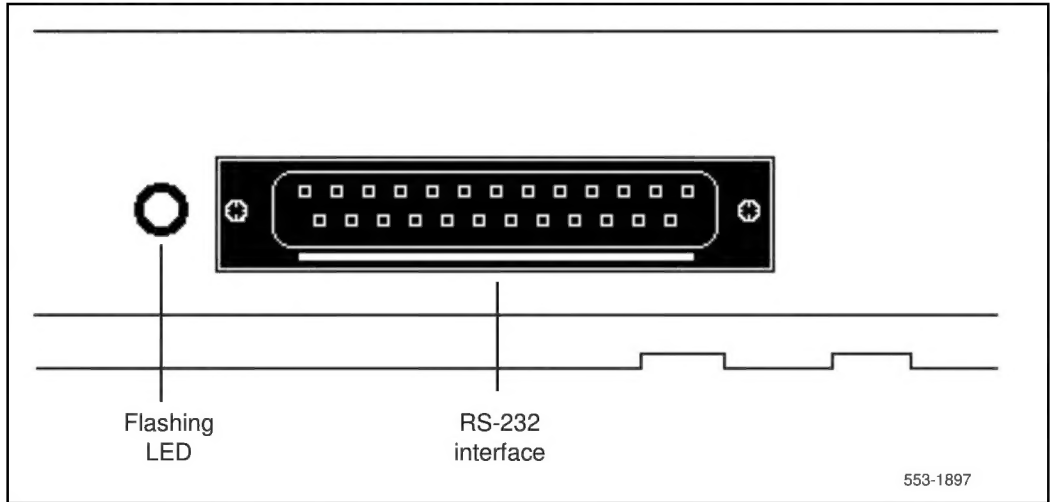


Figure 3
Block diagram of MCA and Meridian Modular Telephone

